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ABSTRACT

A review of the literature regarding mastery learning suggests that mastery learning can benefit gifted education programs in two ways. First, the process provides information to determine if gifted students have mastered essential elements for a particular subject area, a necessary but often overlooked step before proceeding to enrichment. Second, mastery learning provides alternatives (such as student-directed learning, discovery learning, and peer tutoring) for gifted students once mastery has occurred. Teachers of gifted students must be prepared to extend instruction beyond the mastery level. Mastery learning provides the initial component of a gifted education program which can be built upon for extended and enriched learning. (Author/CB)

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MASTERY LEARNING
AND ITS IMPLICATIONS FOR GIFTED EDUCATION PROGRAMS

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ABSTRACT

This article examines the implications of mastery learning on gifted education programs. As more and more states are requiring documentation of the basic skills before allowing students to move on to other areas of the curriculum, the theory of mastery learning may be gaining a new position in the gifted education process.

MASTERY LEARNING
AND ITS IMPLICATIONS FOR GIFTED EDUCATION

The Texas educational system experienced a redirection toward the mastery of minimum basic skills in the academic content areas with the passage of HB 246 (Chapter 75) and HB 72. Educators in gifted education are faced with the task of documenting mastery in the essential elements of the curriculum before allowing students to move into either horizontal or vertical enrichment programs. Use of the mastery learning theories may provide the vehicle for documentation needed to meet these state mandates. The focus of this paper is to explore the research in mastery learning and to relate those findings to possible implications for gifted education.

Mastery learning is a concept that has taken on new and renewed emphasis in the past decade. Programs based on mastery learning are found from pre-kindergarten to graduate school programs. The programs may vary in their implied actions, however, they all are tied to the same basic concepts. The theory of mastery learning is based on the principle that all children can learn (Bloom, 1968).

The increased attention to mastery learning stems from two sources. First, researchers in the field of quality of instruction consistently point to elements of mastery learning as an important part of learning and teaching (Brophy, 1979). Secondly, mastery learning is reported to cause improvements in

student achievement outcomes (Block and Burns, 1976). With the increased attention on student achievement and the mandates that students achieve certain minimal skills before proceeding to the next level in the educational system, educators are reviewing mastery learning with renewed interest.

Block (1980) defines mastery learning in two major parts. The theory that any teacher can help virtually all students to learn is the first premise. The second is a set of individualized instruction practices that consistently help most students to learn. As an instructional strategy, mastery learning is designed to provide the needed time for each student to reach mastery, thus increasing the percentage of students who successfully complete tasks and reducing the dispersion of student achievement within a class. Barr and Dreeben (1977) have distinguished between the principles and instruction arrangements for mastery learning. They stated that mastery learning strategies are based on pedagogical principles that pertain to three conditions at the student level: aptitude, ability to understand instruction, and perseverance; and two conditions at the classroom or school level: quality of instruction and time allowed for learning.

In implementing mastery learning into an educational system there are usually four phases. The first phase, "preinstructional assessment", measures prerequisite knowledge. The second phase, "initial teaching", most often involves group instruction. "Remediation" is the third phase involving individualized materials or tutoring. The final phase,

"certification of mastery", is reaching the predetermined criterion level (Block, 1980).

Mastery learning is a concept involving a specified set of instructional objectives, the specification of some criteria of mastery for the objectives, and time allowed for the students to reach these objectives can be found in the work of other instructional systems (Lindvall and Bolvin, 1967; Masoner, et all, 1980; Talmage, 1975). Many of these are individualized systems that allowed little time and few opportunities for group instruction. Mastery learning as a strategy tends to rely more on group instruction. Because of this reliance, it requires the teacher to plan both the organization of the time and conditions under which the instruction is given (Bloom, 1968).

Bloom's Learning for Mastery Model is the basis for most of the current applications of mastery learning. However, concepts of mastery learning were earlier described by Washburne (1922) and Morrison (1926). Bloom's model includes the following major components:

1. Mastery of any subject is defined in terms of sets of major objectives which represent the purpose of the course or unit.
2. The substance is then divided into a larger set of relatively small learning units, each one accompanied by its own objectives, which are part of the larger ones or thought essential to their mastery.
3. Learning materials are then identified and the instructional strategy selected.
4. Each unit is accompanied by brief diagnostic tests to measure the student's developing progress (formative evaluation) and identify the particular problems each student is having.
5. The data obtained from administering the tests is used to provide supplementary instruction to the student th help him overcome his problems. (Bloom, 1971)

In reviewing the effects of the mastery learning system, Barr and Dreeben (1977) raised the following questions: (1) Do such

methods work with cognitively heterogeneous groups of students? (2) What do teachers do or what are teachers supposed to do during remediation stage? (3) Does the system provide time for all students to reach mastery within time spans that schools can realistically allot to the task? Many of these questions were answered in the Korean Educational Development Institute (KEDI). Although contained in the KEDI system were other components of instructional television and radio, team teaching, and other organizational elements, it followed the basic plan of mastery learning. Masoner (1980) conducted research of the project. Teachers were assigned fifty to sixty students. The teacher was given a guide, which specified the units to be covered, time allowed per unit, objectives, and mastery level test with the specified criteria. The results showed that the teachers did use the preinstructional assessment procedures as recommended, but did not have sufficient time to bring all students to the predetermined level of mastery before beginning the next unit. After implementing the group instructional procedure, the students were divided into 3 categories: mastery, near mastery, and lack of mastery. Generally, mastery students served as tutors for the near mastery and some of the lack of mastery students, while the teacher concentrated on the lower group. To increase time available for instruction, students were required to work on the weaknesses at home and during one special period or more set aside for this work each week.

Thus, there were two ways of getting additional time for remedial work. As a result of these procedures, 60 to 80

percent of the students in a given class were able to reach mastery for each unit. In nearly all units for grades 2 to 6, the percentage of mastery students in the program exceeded the percentage for the control schools (Masoner, et all, 1980).

Mearech (1985) investigated the effects of 5th grade student teams using mastery learning strategies on math achievement levels. The results showed higher achievement gains for pupils in the mastery learning teams than for those in traditional groups.

In studies comparing cognitive and affective outcomes for mastery learning students in other systems, Block (1980) states that there is little question that mastery learning practices and ideas promote student growth.

Because of the problems of generalizations and comparisons between any two school systems or classrooms, caution is needed in accepting these findings beyond the research situation.

How effective are these theories of mastery learning? No one study can answer this question. Systems of mastery learning have been evaluated at different times, in different settings, and with different results. To determine how effective these systems are, research findings have to be synthesized from a variety of sources. One recent synthesis was conducted by Guskey and Gates (1986). They included 27 studies in the meta-analysis. Five areas of program effects: student achievement, student learning retention, time variables (time on task, time spent), and teacher variables were included. Of

course, student achievement was the primary variable of interest in 25 of the studies. The most common measure of achievement was the student score on teacher prepared unit or course examinations. Only 3 of the studies measured student retention over time. Students were retested over the material at 2 to 4 week intervals in two studies and after 4 months in one study. Time related variables were measured in four studies. For the meta-analysis, the variables were quantified by using the effect size statistic. An effect size of +1.0 is considered exceptionally positive for educational program studies (Borg and Gall, 1983).

The results of the synthesis showed that all schools registered a positive effect size in student achievement as a result of mastery learning. The effect size varied greatly from .02 (Slavin and Karweit, 1984) to 1.70 (Arlin and Webster, 1983). A closer analysis showed effect size to be larger for elementary students and lower for high school students.

These achievement results may be explained by Bloom's Theory of Mastery Learning (1976) where the student's cognitive entry level has a very strong influence upon their learning. Therefore, elementary students enter the classroom with less previous learning than high school students, and the potential then for achieving improved achievement levels is greater.

Another important finding from the synthesis is the effects of mastery learning in all subject areas. Greater gains in learning appeared in the more highly ordered and sequential courses, such as math and science, than in social studies and

language arts.

The results of retention by mastery learning students seemed to have a substantial effect (.52), although not quite as large as the effect on initial learning (.63). Time on task comparisons between mastery learning classes and non-mastery classes yielded a positive effect size (.68).

One more finding of the synthesis showed that teachers using the mastery learning strategy develop more positive attitudes toward teaching, higher expectations for their students, and a greater personal responsibility for learning outcomes; but may experience diminished confidence in their teaching skills. The synthesis also provided insight into the effectiveness of group based mastery learning. Guskey and Gates summarized by stating that it appears mastery learning can be implemented in regular classrooms with little revision in curriculums or policies.

Discussion of the Research

All of the studies reviewed in this paper showed significant gains during a short term or semester period. Some of these studies may be subject to validity threats. In most of the studies students were receiving the mastery learning techniques for the first time in their school. They may have been responding to the novelty of the new instruction and therefore the studies could be subject to the Hawthorne Effect. This is any situation in which the experimental conditions are

such that, the mere fact, that the subjects are participating in an experiment tends to inspire performance.

To add significance to the original finding, a longitudinal study may be suggested. By continuing the research over a period of several years, the above mentioned threat to validity may diminish.

Conclusion

Mastery learning would benefit gifted education programs in two aspects. First, the process would provide information to determine if the gifted students had mastered the essential elements determined by Chapter 75 for a particular academic area. This information would be documented as to the students mastery of the material. It is often assumed that because a child is gifted, that he/she already knows the information at the basic level and is ready to proceed to enrichment. This assumption can often lead to gaps in the knowledge base of gifted students. Second, mastery learning would provide alternatives for gifted students after mastery had occurred. Of these alternatives, the gifted students may be guided toward a more student directed approach to learning, such as, discovery or inquiry learning strategies. Another alternative would be to utilize these students for peer tutors of the non-mastery groups.

There are some considerations that must be taken into account before mastery learning is implemented for gifted

education programs. The teacher must be prepared to extend the gifted student beyond the mastery level. This would require additional materials and preparations for these students. A teacher may select to avoid this work by continually using the gifted students as peer tutors. This situation would prohibit any extension of the curriculum and must be guarded against by proper teacher training and selection. By having gifted students in a heterogeneous mastery learning classroom the bookkeeping chores would become very time consuming for the teacher. A teacher would have to be aware of these restraints before implementation of the process.

Mastery learning could provide the initial component of a gifted education program that provides for the documentation of basic skills mastery. The students could then be extended into the differentiated part of the curriculum. Mastery learning is by no means the only strategy to employ in gifted education. It is, however, a very viable strategy as the first building block in the global gifted education program.

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